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The Establishment and Development of the Customs Information Technology Data Platform

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Abstract

In recent years, although China's foreign trade is developed rapidly, Customs operations still face challenges. This paper is based on the Nolan model, Synnott model and Mische model and depended on innovative technology of RFID and ASN to study. In addition, the writers suggest that Customs should establish an information technology data platform to address the plight of the current customs management and to propose policies and applications for law-enforcing department, finance department, tax department, the legislative and related industries.

Key words: Radio frequency identification; ASN; Customs information technology data platform

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INTRODUCE

In the last years, the Customs Department achieved remarkable success in the "Customs clearance" strategy issued by the State Council. Local Customs focused on the application of modern scientific and technological means to build a new and convenient customs clearance mode and to achieve good import and export management and services. Through the construction of "e-Customs" and "e-port", the customs has so actively explored new ideas, new models, and new ways of Customs supervision that are relied on international practices and modern logistics to support and promote the healthy development of foreign trade, and enhance the further development of China's international logistics industry.

1. CURRENT CONDITION OF CUSTOMSELECTRONIC INFORMATION PLATFORM

Although China's foreign trade is developing greatly, and the Customs all over the country is making significant efforts to keep up with the pace of development of international trade, it is apparently no better than developed countries'. The improvement of the Customs' administration, operations, and regulatory aspects cannot be ignored as well. As a result, the Customs should propose efficient solutions to open up new roads aiming at solving difficulties and major bottlenecks of the Customs management with the help of electronic technology to establish information technology data platform.

2. THEORETICAL FOUNDATION

Harvard University professor Nolan (1979) divided development path of computer information systems into six stages in 1979 that are the initial stage, the expansion stage, the control stage, the integration stage, the data management stage and the mature stage. From the first stage to the third stage, though individual business applications appear, there is still "digital divide" and "information island" phenomenon. In the fourth stage, integration and development of the system continue to receive significant attention. Then in the fifth stage, database platform, data management systems and information management platform became a unity, and each department, each system achieved integration of basic resources and information sharing.

Therefore, business data is increasing significantly, the requirements for business applications data is rising

as well. Finally, in the sixth stage, information systems have met the needs of all levels--from simple transaction processing to efficient management

In the 1990s, Mische made additional comments for Nolan model. He believed that in the Nolan model, integration and data management are actually inseparable. Besides, data management which views the data integration as the core is essence and main features of the integration phase. So Michelle model is considered the general path of information technology by the start, grow, mature and update these four stages.

U.S. information systems expert, Mr. Synnott (1987) noted that in the information age, competition was everywhere. When managing information, you should consider achieving the optimal configuration of information to form differentiated competitive strategy rather than gaining reasonable and labor-saving objective by the information system. So on the basis of the Nolan model, he proposed a "four-phase passage says" whose core idea is that with the deepening of information processing, the value of information is rising and information will become a powerful weapon to beat the rivals in the end.

With the combination of these models, integration, application and management of systems and establishment of database is the top priority through the development of computer information system.

3. CHALLENGES OF THE CUSTOMS MANAGEMENT AND OPERATION

3.1 No Means to Track Imported Products and Difficulties for Quality Supervision

Take industry of imported medical devices as an example, imports of China's medical devices accounted for a large portion and high-end imported medical equipment can occupy more than 90% of the market. According to statistics from Chinese Medicine & Health Products Import and Export Chamber of Commerce, China's medical device imports amounted to 12.472 billion U.S. Dollars in 2012, and achieved an increase of 14.56%. Imports of medical equipment products just in 2012 1st-9th months was much higher than 2009 imports of the whole year (see Figure 1). It is visible that demand for imports is increasingly strong, and imports rise every year. However, on August 6, 2013, the State Food and Drug Administration announced the recall of 4 imported medical devices: Due to defects in the design or production, GE Healthcare, Respironics California, Inc., Medtronic Inc. and Gambro Kathetertechnik Hechingen voluntarily recalled its separately medical products. Because of huge market share occupied by imported medical devices and frequent occurrences of recall, we need to think about the solution.

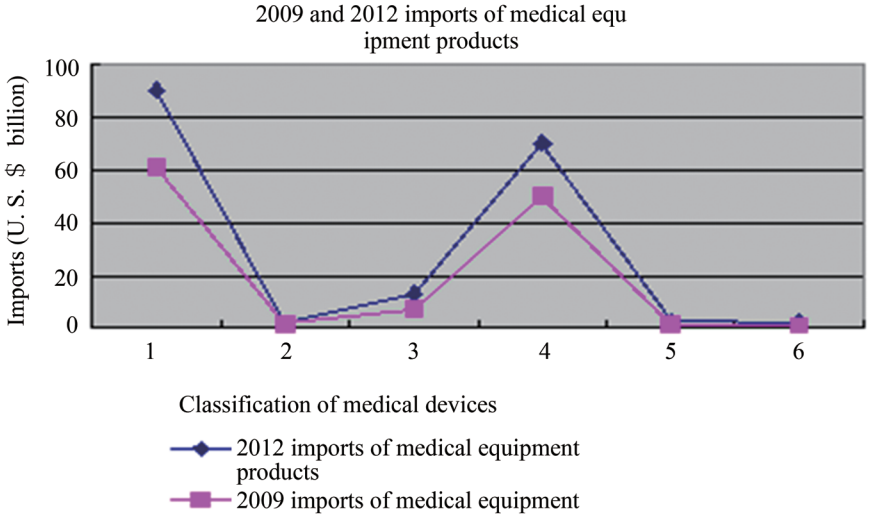

Figure 1
The Imports of Medical Equipment Products Between 2009 and 2012
Point 1 Presents Total Medical Instruments, Point 2 Presents Medical Dressings, Point 3 Presents Disposable Supplies, Point 4 Presents Diagnosis and Treatment of Hospital, Point 5 Presents Health Rehabilitation Supplies, Points 6 Presents Dental Equipment and Materials
Resource: Chinese Medicines and Health Products Import and Export Chamber of Commerce.

3.2 Lack of Information Communication Which Harms Customs Operations Process

In December 1993, China formally launched the initial project of national economic technology—"Three Golden Projects", namely Golden Bridge Project, Golden Customs and Golden Card Project. On August 5, 2002, China started and accelerated the construction of another eight business systems. But Cheng (2010) proposes that there is still poor coordination among government departments during the process of "Customs clearance" construction in the Yangtze River Delta region. Although China consciously promoted the construction of all major

business systems, it failed to achieve the desired purpose of sharing information, and even "Twelve" project was figuratively called "information islands". Such drawbacks hinder the operation of the entire customs data and lead to a waste of resources.

3.3 Serious Tax Evasion Problems and Huge Tax Gap

For example，in China, diamonds have been exempted from customs duties, but import VAT (Value Added Tax) is still up 17%. And as for clothing and other luxury brand bags, combined tax rates are generally higher, many in the 60% to 120%, some as high as 200%. Mainly because of the price factor, rising Chinese consumers in the mainland always buy luxury goods in foreign countries or Hong Kong, Macao, Taiwan (see Figure 2). If consumers purchase at such places, he or she carries or asks others to bring goods back to China to escape customs checks. These are ways for purchasers to complete tax evasion. In fact, people who entry and exit the customs frequently have high risk of Smuggling or tax evasion. Customs ought to come up with countermeasures to monitor those people and prevent such illegal acts.

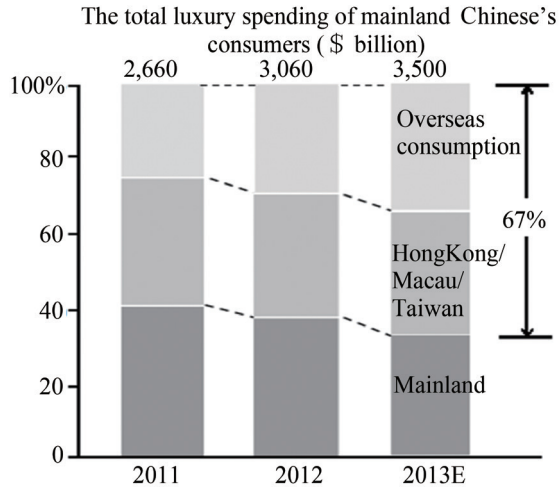

Figure 2
The Total Luxury Spending of Mainland China's Consumers ($ billion)
Resources: Bain

3.4 The Route Before Goods Into the Customs Is Unknown, and It's Difficult to Protect Consumers Rights

Firstly, part of domestic products are exported abroad before returning home in order to be disguised as imported products by chance of the export tax rebate. Such behavior defrauds consumers, and raises goods prices. Secondly, many luxury brand outlets in China do not provide genuine identification services, so consumers could not verify the authenticity when they purchased by others or electronic shopping ways.

4. CONSTRUCTION OF CUSTOMS INFORMATION TECHNOLOGY DATA PLATFORM

Based on analysis of the challenges and Nolan model theory, Chinese Customs electronic platform is still in the third or fourth stage (see Figure 3), and does not reach the fifth and sixth stage where the public systems use shared data and users shared responsibility with people who process data. Therefore, according to the theory and future trends, the platform should soon be able to reach the sixth stage to achieve purposes that help customs and provide service for the public. Considering objectives above, this paper aims at the establishment of Customs information technology data platform to propose recommendations and solve problems. Prior to the establishment of a database, the first thing should be introduced is innovative technology we rely on.

4.1 Innovative Uses of RFID

4.1.1 Background of Use of RFID

Wong (2009) proposes that RFID is radio frequency identification system which means that automatic target is recognized through radio frequency signals and then we have access to relevant data. RFID identifies work without human intervention, and can work in a variety of harsh environments. It can identify fast moving objects and multiple tags, and be fast and easy to operate. He also mentions that RFID technology is now used primarily for container security and related electronic lock, but has never been used in the general import goods check. The reason is not because of the lower level of RFID operation and implementation. Because of the first retail trade show of Walmart in June 2003, Walmart's CIO Dillman presented that Wal-Mart would ask its top suppliers to implant radio frequency identification chips in their article in 2004. It is apparent to see the actual operation and use of the RFID technology for Walmart in good management.

4.1.2 Specific Operations of RFID

Customs should enforce imported goods attached RFID tags at the factory, especially for jewelry, diamonds, watches, luxury clothing, bags and other portable items and imported medical equipment, medicines, food and other goods needed to ensure safety. While a label must be inside to record trade names, commodity prices, commodity factory information, HS Code, commodities consolidated tax rate, commodity taxes and tax payable, areas that trade flows through and so on.

4.2 Innovative Uses of ASN

4.2.1 Background of Use of ASN

ASN is Pre-Delivery Checklist that manufacturers or wholesalers use electronic communications networks to transmit cargo detailed list to retailers in advance. In

this way, retailers can make advanced preparations for the purchase of goods, eliminate goods data entry jobs, and achieve commodity inspection work high-efficiency. Buyers can also check the delivery quantity, the remaining quantity of the order through such checklist, and promptly correct the error on the number.

4.2.2 Specific Operations of ASN

Since ASN is currently only used to communicate with manufacturers and retailers, and the main message in ASN is cargo data, it does not maximize utility. If the ASN is jointed operations with RFID, that is to say, gathering all the information from RFID together to enter ASN, so retailers cannot only get a detailed list of the quantities of goods, as well as all data RFID collected. We hope that manufacturers or wholesalers can send ASN to Customs beforehand. And then the customs can compare data from ASN with RFID from goods that enter the Customs, to speed up the clearance rate, and promptly correct the errors.

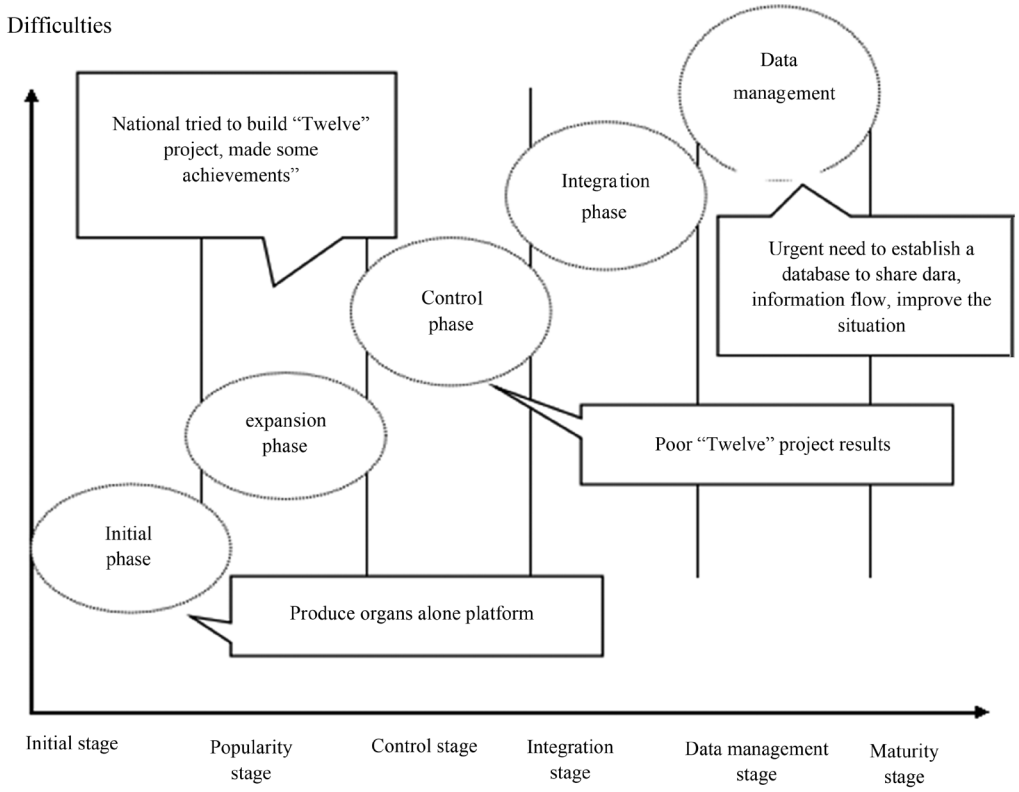

Figure 3
Status Map Based on Nolan Model and Dilemma of Customs Operations

4.3 Data Collections

Although there are advanced and innovative technology as the basis, data needed to build a huge database should be from all sides as a support. So data collection is a priority among priorities. All kinds of information about products can be obtained from the RFID. Buyers information can be gotten through the ASN and information about where the product flows through is also recorded by the local Customs authorities to input into the database. As for qualification of suppliers and buyers is recognized by the business sector and provide tax payable and tax-related data such as personal tax records provided by the tax authorities. And information such as individual entry information, reporting belongings directly issued by the customs is input into the platform.

4.4 Establishment of a Database

We divide variety of the database into five categories, namely (a) Product library, (b) supplier library, (c) Buyer library, (d) qualification library, (e) personal information database. Mutual communication is needed among the various databases, and data includes the recording data from RFID and other credit, qualification, tax situation, etc.. Classification of specific databases and details of data can be seen in Figure 4. Source of data in the database is from the institutions in the box below, in turn, following applications offer such sectors services. It conforms features of the sixth stage in the Nolan model - mutual communication of information and sharing responsibility with users.

Although the establishment of the Custom information data platform needs the cooperation with

other departments, it can provide convenience for the launch of work in other government agencies after its establishment. For example, Tax Authorities and Financial Institutions can learn the detailed information of the year's customs tax consequences, the comparison between the tax consequences of this year and former years, the increase and decrease of tax returns for the departments and so on. Moreover, during the survey of the corruption of officials, the anti-corruption department can apply to the customs for checking out data from the personal consumption database, finding out whether the personal consumption meets the personal income.

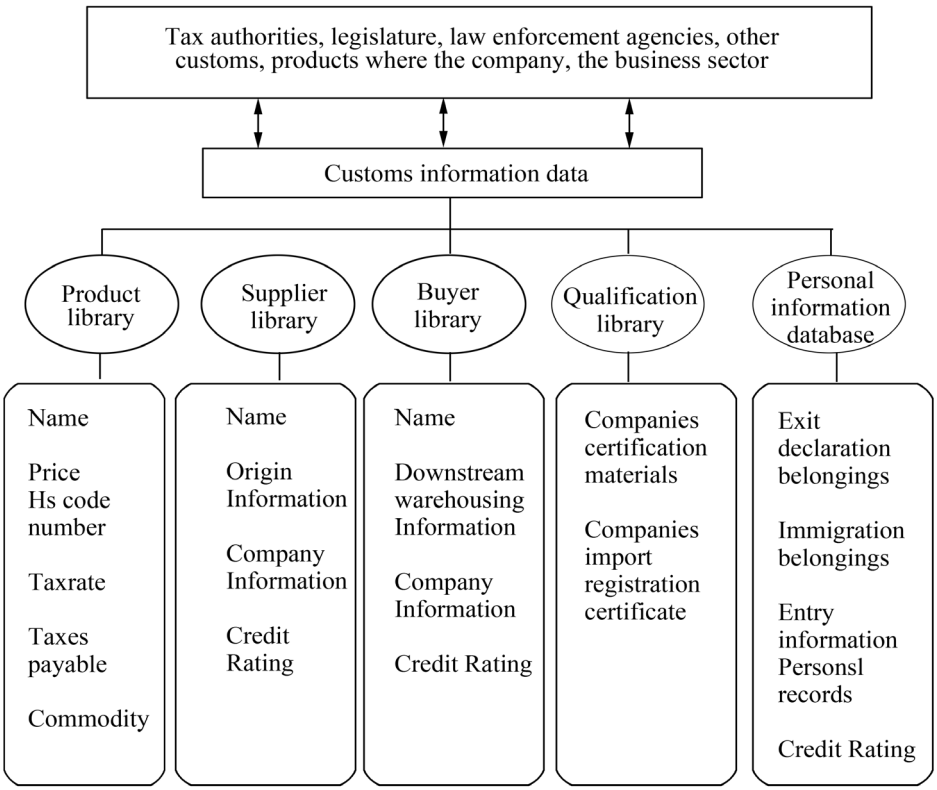

Figure4
Classification of Specific Databases and Details of Data

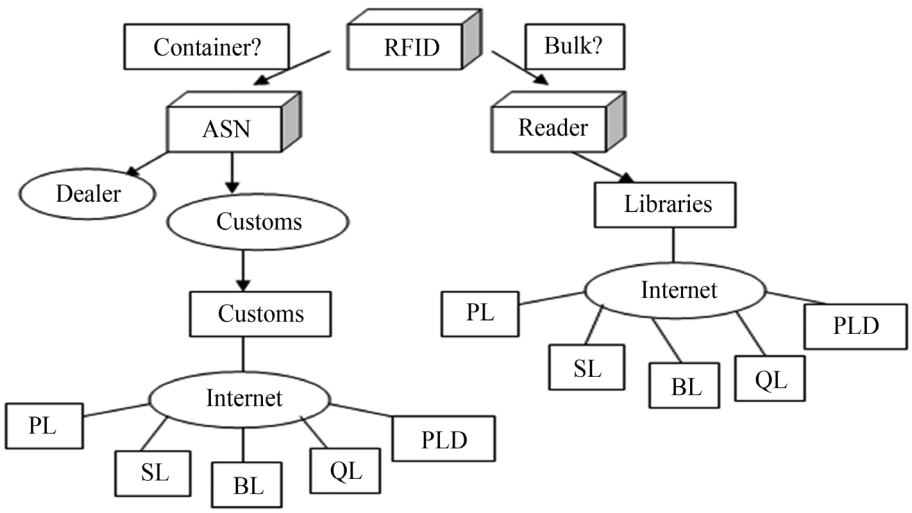

Figure 5
Flow Charts of ASN's and RFID's Use
Remarks: PL Presents Product Library, SL Represents Supplier Library, BL Represents Buyer Library, QL Represents Qualification Library, PID Represents Personal Information Database

4.5 Establishment of a Database Meets the Requirements of the Nolan Model of Information Platform Development

The construction of the database can achieve integration and collection of data from multiple resources not only to realize the purpose to make a comprehensive application of information flow in the Nolan model 6th stage but also to complete strategic planning of data resources. In addition, this approach will improve Customs e-government platform and complete the office automation. Furthermore, the database is divided into five libraries, and the library is divided into multiple data resources to achieve the purpose of data resource management. (see Figure 6: The red circle is completed purposes). Considering all analysis above, a reliable conclusion can be drawn already: The establishment of an information database realizes the objective that Customs data platform can jump over the fourth and fifth stages and then develop to the sixth stage, that is to say, the mature stage, which is a qualitative leap.

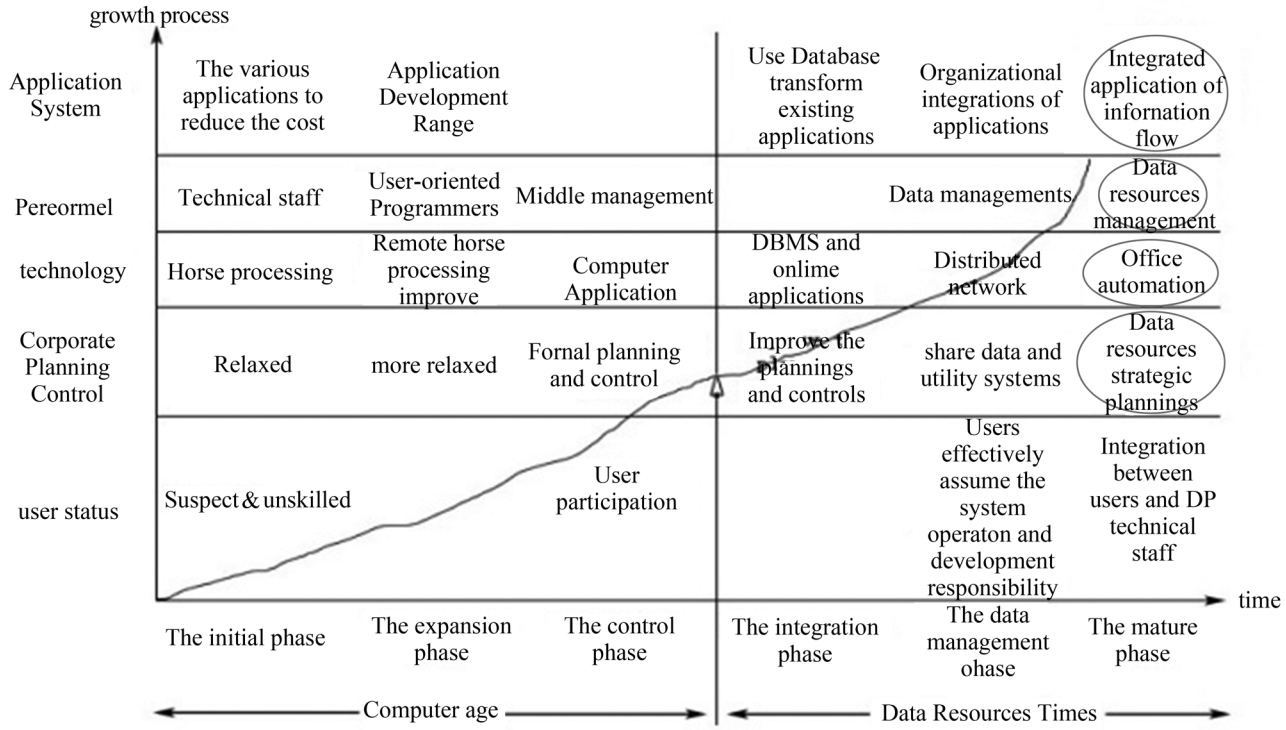

Figure 6
Nolan Model

5. USE INFORMATION TECHNOLOGY DATA PLATFORM TO OVERCOME CUSTOMS ADVERSITY

5.1 Detect Tax Evasions, Punish and Compensate for the Tax Loss

Because RFID from imported goods ought to be collected tax categories require to pay, the consolidated tax rate and the tax payable in specific circumstances, if the Customs finds merchandises are not paid taxes, goods cannot enter and suppliers will receive punishment or warning. In addition, fines, warnings and other treatment methods should be included the personal information library or supplier library, and then lower its credit ratings. Moreover, the Customs should pay more attention to individuals or enterprises above. And as for behaviors related to large sums of tax evasion, such record can be delivered as evidence to the law-enforcing department. For companies with high credit ratings, the Customs could learn experience from the UK that carries out a modest reduction in its exit process and relax appropriate restrictions to accelerate the speed of clearance. We can see the flow chart in Figure 7.

Approaches when consumers carry goods into the Customs and do not pay tax are as follows: individuals are required to declare goods they carried and RFID tags are affixed to declare objects before departure. Such information should be recorded into the personal information database. When they are into the Customs, the customs scans their carry-on items and tune out its RFID tags to check before leaving the country. Once tax evasions are found, punishment is in accordance with the preceding paragraph.

Approaches when suspected smugglers who frequently immigrate are found are as follows: According to above approaches, Customs can find how frequently one person is in and out Customs through RFID and recorded data

from a personal information database before departure. If there is a day trip or no more than a specific time the customs make, this person should be taken a particular attention by Customs. And then recall its RFID records, carefully check whether the entry products are the same, or there are smuggling trends and traces. Once found, such thing can be dealt with right now. To conclude, it will no longer be difficult to capture this smuggling in the future through the use of RFID, and further compensate for losses caused by tax evasion.

5.2 Safeguard the Interests of Consumers, Provide Brand Guarantee

Because suppliers are required to attach RFID which is only owned by themselves to the goods at the factory. In addition, no matter where goods are processed in the factories or are circulated to the hands of consumers, all the procedures and processes are recorded in RFID. When goods are into Customs, if found RFID does not meet genuine requirement or does not meet the brand promise of processing sites, Consumers will know whether the goods are genuine and other relevant information about the products. All process that the goods shipped or flowed can be gained. Furthermore, Consumers no longer need to be worried about how to do authentic identification. So this way brings safety, convenience, peace of mind and high-efficiency to every customer, and also effectively protects the interests of consumers when they purchase goods from others or in international ways.

5.3 Track Effectively, and Improve Credit Rating System

Thanks to the collection of information and the establishment of informative data platform, we attempt to link the e-government platforms between the customs and the quarantine department, record the information of the recalled products into the product library, and record the credit ratings and bad records of the suppliers into the supplier library and qualification library, so that we can know the quality problems of the goods from each supplier and the credit rating of themselves, help the purchasers to optimize their cooperation projects and choose sellers with higher quality assurance to cooperate with. Besides, because of the establishment of an information data platform, we can establish relevant information about the downstream buyers in the product library itself. The information can be provided to the quarantine department for product inspection, reaching the aim of tracking the follow-up of quality problems, saving the time of tracking goods of relevant departments, and optimizing the operation mode.

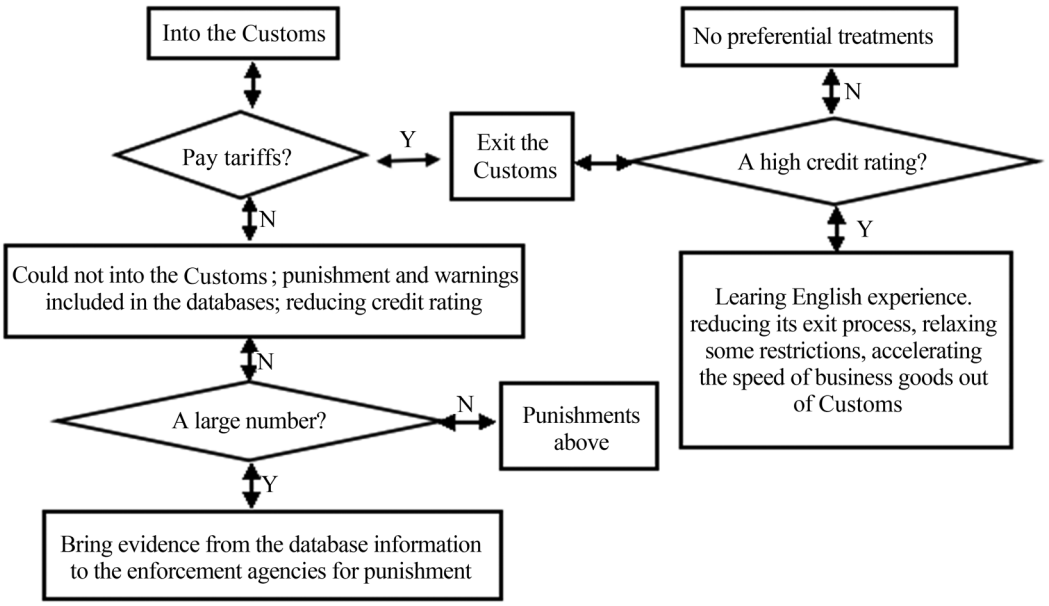

Figure 7
Flowchart of Imported Goods Into the Customs

5.4 Break Isolated-Information Structures, and Improve the Information Sharing and Data Flow

The cooperation between the Customs information data platform and information platforms from other ministries breaks the "isolated-information structure" left by the "twelve operational systems" project. Then, it opens the new situation of the information sharing and data flow among government departments. For example, the Customs information data platform has to exchange data with the police to attain individual information when the Customs establishes personal consumption database. The Customs information data platform also has to attain proper documents of importers from the State Council's drug regulatory agency before establishing the clientele

library. It needs help from the Customs throughout the country to attain information about commodity circulation when it establishes the product library. Since the Customs information data platform is based on other information platforms, it gets to the final purpose of the information sharing and data flow within government departments.

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